Using Computer-based Assessment and Feedback: Meeting the Needs of Digital Natives in the Digital Age

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ABSTRACT

Assessment and feedback represent two key factors that affect students' learning. Using e-assessment with prompt e-feedback reduces the gap between present and desired performance and is considered to be a reflexive and dynamic system in dealing with the new generation of digital natives. Action research was used to investigate students' perception of using computer-based assessment (CBA) and/or computer-based feedback (CBF) in teaching and learning process. Both semi-structured interviews and focus groups were conducted with 44 UG students to assess their perceptions of using CBA and CBF. Findings show that students are generally agreed on the use of and benefits of CBA and/or CBF in teaching accounting and non-accounting modules. For example, these results reveal that many participants valued working online compared to traditional assessment and appreciated the instant feedback they received. Additionally, technology can provide an avenue for assessment and personalised and comprehensive prompt feedback that diverse and digital students need in the 21st Century Higher Education.

Keywords: Diversity, teaching and learning; accounting education; CBA; CBF; digital natives

INTRODUCTION

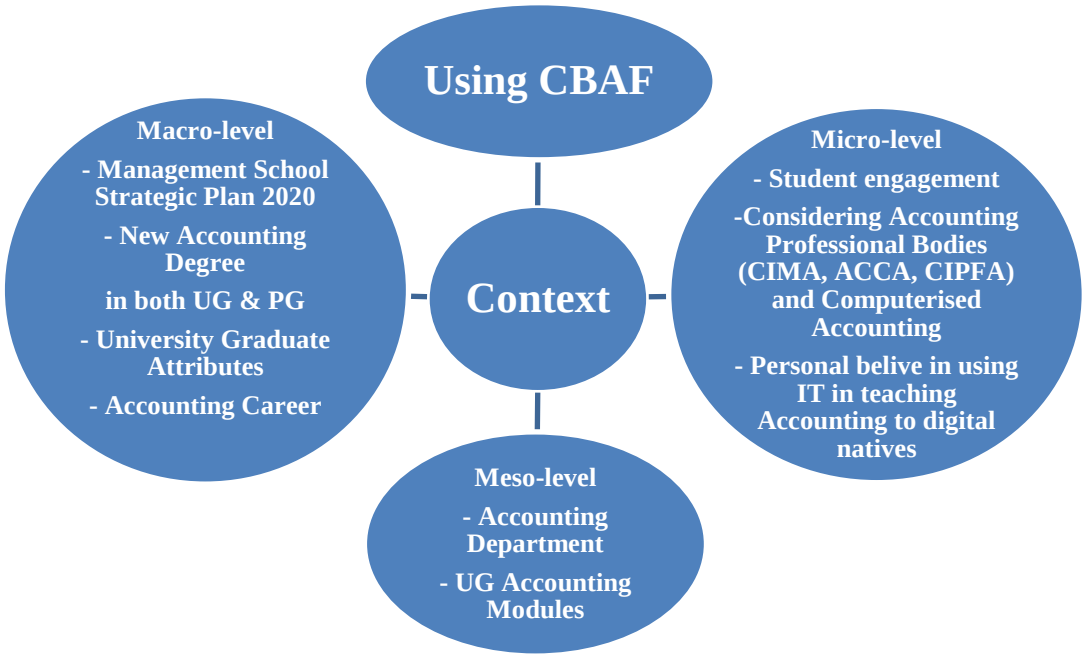
Over the last decade, a significant debate has arisen about the skills of the current generation of students due to their intensive use of technology and social media; including blogs, forums, photo and video sharing, Facebook, Twitter, Wikipedia, Linkedln, etc., (Brown & Czerniewicz, 2008), and the best way of involving diverse digital citizens in higher education institutes (HEIs) (e.g., Bullen et al., 2011; Dabbagh, 2007; Debuse & Lawley, 2016; Jones et al., 2010). Online distance learning has seen a vast growth in the last decade, which is expected to continue in the future. In their recent study Gros et al. (2012) reveal that the main reason is that regular use of technology in everyday life indicates that skilled digital learners are able to transmit their digital knowledge and experience to teaching and learning activities (see, also, Jaggars & Xu, 2016; Maier et al., 2016; Wollscheid et al., 2016). Indeed, we cannot ignore that using technology in teaching and learning in higher education (T&L in HE) is a key factor to meet the expectations of *"digital citizens"* and *"digital migrants"* (Bayne & Ross, 2007; Debuse & Lawley, 2016; Kim, 2015; Kirkwood & Price, 2005; Oblinger & Oblinger, 2005; Van der Kleij et al., 2015).

The wide use of technology to improve assessment and feedback is a growth area in HE as a response to meet the needs of *"the Net Generation"* (see, for example, Biggs, 2003, Biggs & Tang, 2011; Bullen et al., 2011; Carless, 2007; Dabbagh, 2007; Debuse & Lawley, 2016; Maier et al., 2016; Race, 2005). Race (2005), for example, stated that teachers are finding that online feedback will enhance the process of providing instant and useful feedback, and generate appropriate evidence for the quality of feedback. Additionally, tutors can use both computer-based assessment (CBA) and computer-based feedback (CBF) to provide timely information on the students' performance and to diagnose and analyse the weaknesses and strengths of their students. Equally, Biggs & Tang (2011) add that using technology in assessment and feedback will motivate and support students to improve their learning as well as provide teachers with feedback about the effectiveness of their T&L approaches (see, also, Jaggars & Xu, 2016; Maier et al., 2016; Wollscheid et al., 2016). Joint Information Systems Committee (2010, p.5) states that "Assessment lies at the heart of the learning experience: how learners are assessed shapes their understanding of the curriculum and determines their ability to progress. At the same time, assessment

and feedback forms a significant part of practitioners' workloads and, with increased numbers, reduced budgets, and higher learner expectations, continue to be a matter of concern for many institutions."

With the view that using computer-based assessment and feedback (CBAF) may shape learners' expectations and engagements in the T&L process (Aisbitt & Sangster, 2005; Debuse & Lawley, 2016; Joint Information Systems Committee, 2010; Kim, 2015; Marriott & Teoh, 2012a, 2012b), HE tutors recently decided to use IT in teaching accounting modules using CBAF. For example, *at a macro level*, universities and students asked teaching staff for diverse assessments and more electronic and timely feedback. Additionally, students asked their tutors for more timely and comprehensive feedback. While *at a micro level*, accounting and finance departments, professional bodies such as ACCA, CIPFA and CIMA started to use CBA at various levels. Furthermore, such CBA and CBF are not well-developed methods among the accounting groups. Lastly, *at a meso level*, Tutors believe that adopting CBAF may lead to more student engagement, and help to introduce new computerised accounting programmes and modules (see, Figure 1 below). Additionally, the researchers of this action research (AR) have personal beliefs in using technology in teaching accounting modules and digital learners. Thus, we trust that using technology could assist the process of designing assessment and evaluating the progress of our accounting and business students by giving them detailed and timely online feedback-feedforward reports.

Figure 1: Fanghanel's (2007) Contexts for Action Research



Responding to the above calls, the Accounting group in the Management School of a UK university decided to use technology in assessing undergraduate (UG) students. In 2013, the Accounting staff started with a level 2 accounting module: Intermediate Financial Accounting. In doing so, the module leader, developed a pool, a set of questions available to be selected from, to create a CBAF for this module. And then more CBAFs were developed and extended to other accounting modules at levels 1, 2 and 3 by additional accounting staff. In this light, the main purpose of this AR is to explore and assess students' perceptions of the use of CBA/CBF they received on their T&L process and academic performance respectively. To this end, an AR methodology was used to answer the following question:

ARQ1. How do students assess and perceive the use of CBA and/or CBF in T&L accounting modules?

In doing so, 2 focus groups and 26 semi-structured interviews were undertaken with students studying accounting modules. To sum up, this chapter used an AR methodology describing a case study where CBAF was introduced into some accounting modules to meet the needs of the current digital students.

To this end, this chapter is organized into five main sections including an introduction. Section 2 reviews the literature on diversity in HE, assessment and feedback and then considers the CBAF and its impacts in T&L future digital natives and general assessment theory. Then section 3 outlines the AR methodology and its rationale. The qualitative results from both semi-structured interviews and focus groups are reported and analysed in section 4. Section 5 summarises and concludes the chapter showing the main recommendations for educators, academics, educational technologist, practitioners, learning facilitators and researchers interested in using technology in T&L the digital citizens in the 21st Century HE.

LITERATURE REVIEW

This section discusses existing literature on diversity, assessment and feedback, the rationale of using CBAF and reviews the general assessment theory.

Diversity in Higher Education

Diversity is certainly emerging as a critical issue facing HEIs today. This is an issue emanating from the need to prepare students for an increasingly complex and pluralistic society in the digital age. Over the past twenty-years, HE has seen significant demographic changes that have created a student population more racially and ethnically diverse than ever before (Griffin et al., 2016; Ramburuth & McCormick, 2001; Stoicovy & Sanchez, 2007). T&L diverse student population presents unique challenges in which learners differ in terms of educational backgrounds, levels of income, home language, culture, age group, religion, ways of learning, etc. Given this growing diversity on campuses across the country, teachers, and their universities are beginning to legitimise multiple ways to teach and assess the performance of those diverse students (Gardner, 1999; Stoicovy & Sanchez, 2007).

In practice, diversity is a concept that though comprising a wide spectrum to include, amongst others: gender, race, ethnicity, culture, physical ability, the ultimate aim of diversity varies from improved social development, creative thinking, self-awareness to preparing students for work in a global society (Griffin et al., 2016). It covers a multiplicity of facades and discourses that range from a micro view of teaching culturally diverse students to a more global perspective of plurality, equality, intellectual and moral development. Evidently, the dynamics of diversity in HE has

changed in recent decades, and a new model is emerging to give a contemporary face to that is more relevant for diverse students in the 21st century HE (Gurin et al., 2002; Ramburth & McCormick, 2001). With a varying degree of diversity and perceptions of diversity, it becomes more important to understand how diversity is established in HE and its implications for the T&L process, assessment and feedback systems, students, educators and other relevant stakeholders in the digital age (see, Brown, 2002; Brown et al., 2003; Carless, 2007).

Due to the fact that today's diverse cohorts of HE born 1980 to 2000 live almost all their lives in a very dynamic environment, it could be concluded they have some special skills to use technology and to be technology-savvy (Kopackova, 2015; Prensky, 2010; Thompson, 2013). These digital natives are native speakers of the digital language of computers, iPhones, social media, video games and internet (Debuse & Lawley, 2016; Evans, 2013; Kopackova, 2015; Maier et al., 2016; Prensky, 2010). Usage of technology is not the only feature that these diverse Net (Google) generations have but also they need different learning and assessment styles to fit with their cognitive capacities (Evans, 2013; Kopackova, 2015; Thompson, 2013; Wollscheid et al., 2016). Diversity and its digitally, therefore, is increasing among students entering university (Gurin et al., 2002). HE Educators, therefore, need to respond to this in teaching and in assessments and feedback. E-assessment-feedback allows students to be assessed with a series of online questions at a suitable difficulty level, based on the student's cumulative performance in the E-assessment and given timely and detailed E-feedback on this performance (see, Clariana & Wallace, 2002; Debuse & Lawley, 2016). As a result, using technology in the assessment and feedback system will improve the university's ability to create and manage an assessment-feedback system that is valid, fair and consistent to monitor diverse students' performance (Prensky, 2010; Stoicovy & Sanchez, 2007; Thompson, 2013).

Assessment and Feedback in HE

Both assessment and feedback are two sides of the same coin of assessing the performance of and giving feedback to students in T&L in HE. Brown & Knight (1994) claim that assessment lies at the centre of the learner's experience. According to O'Connell et al. (2010), the assessment system, on the one hand, is the dominant

influence on the students learning method and acquisition of new knowledge and experience (see also, Biggs, 2001; Carless, 2007; Evans, 2013; Jaggars & Xu, 2016; Kim, 2015; Rust et al., 2003). This assessment system combines both summative and formative assessment. Formative assessment involves lectures and students responding to students' work with the intention of adjusting it to assist the student to evaluate his performance and to submit better performance in the future (O'Connell et al., 2010; Pryor & Crossouard, 2008). The key difference between formative and summative assessment is that the formative assessment could be a part of the educational method (Pryor & Crossouard, 2008; Torrance & Pryor, 2001). Formative assessment, therefore, could be a learning method that drives to regulate and monitor the loss meaning practiced by students during the T&L process (Pryor & Crossouard, 2008; Roos & Hamilton, 2005). In line with Martinez (2001), the most effective assessment is one that is planned and integrated into the teaching method, written within the early stage of coming up with the programme and remote-controlled by the method of formative assessment and given timely feedback. Likewise, Rust et al. (2005) identify three aspects in a very constructive assessment system: 1) clear association between learning method and outcomes; 2) specific assessment criteria in hand by lecturers and students, and 3) a feedback method during which students are actively involved (see, Carless, 2007; Gibbs & Simpson, 2003, 2005; Rust et al., 2003).

Feedback process, on the other hand, plays an important role in the effectiveness of the T&L process (Van der Kleij et al., 2015). Sadler (1989) states that to push learning, feedback needs students to possess a conceptualisation of the standard (goal performance), be able to compare actual performance with the standard one, and take actions to fill the gap (i.e., the gap between the goal performance, a hundred marks (%), and therefore the actual performance, assessment mark (%)). Nonetheless, it is involved in a remarkably advanced perform of assessment that happens within the convergence of tutor and student perceptions, activities and experiences (O'Connell et al., 2010). In fact, a conflict may arise as a result of completely different perceptions. As an example, the lecturer's perception (writer of feedback) of the feedback process, and student's perception (reader of feedback) of the meaning and usefulness of feedback report. Watty (2006) reported that accounting lecturers' views of the aim of accounting education discriminate between potency, privileges, and concern for

accounting student learning. In the same vein, Trigwell & Shale (2004) stated that the term "pedagogic resonance" custodies the potential for social control, lecturer, and student viewpoints to contrast. This pedagogical resonance is, as a replacement paradigm, an inclusive viewpoint of teaching that clearly reflects each lecturer views and what learners expertise expect? (Prosser et al., 2003; cited in O'Connell et al., 2010).

Assisting tutors to prepare and provide useful and constructive feedback, Juwah et al. (2004, p. 6) define seven principles that facilitate the event of self-assessment in learning; encourage tutor/peer dialogue, facilitate and clarify what constitutes good performance; provide useful information to learners regarding their learning, etc. As stated in these seven principles, feedback should be: "sufficient; focussed on performance instead of character; timely; suitable to the aim of the assessment; taking account of student understanding; received and attended to, and acted upon" (see, also, Evans, 2013; Mansour, 2014; O'Connell et al., 2010; Van der Kleij et al., 2015).

Lastly, assessment identifies what is taught and how it is learnt and that is the way within which students' data, skills, and understanding are often assessed (Maier et al., 2016; Marriott & Teoh, 2012a). Whilst feedback on assessment may be a way of facilitating student self-assessment, gaining knowledge and experience, and inspiring motivations that tutors will use to assist the forming and reforming of their teaching and learning method (Gibbs & Simpson, 2005). Accordingly, good practice of assessment and feedback in T&L in HE may be a method within which tutor/peer dialogue is inspired and wherever students are actively engaged in the T&L process (Juwah et al., 2004). Moreover, clear, constructive and timely feedback can scale back the gap between the actual and desired students' performance and is additionally thought of to be a collectively owned system that is self-generated, handy and active (e.g., Gibbs & Simpson, 2003; Juwah et al., 2004; O'Connell et al., 2010; Pryor & Crossouard, 2008; Roos & Hamilton, 2005; Sadler, 1989; Torrance & Pryor, 2001; White, 2007).

Computer-based Assessment and Feedback: New Way Forward

According to the previous T&L research in HE literature, assessment and feedback are at the centre of discussion among the leading United Kingdom and Northern Ireland higher instructional establishments since the publishing of National Student

Survey (NSS) in 2005 (e.g., Biggs, 2001; Debuse & Lawley, 2016; Kim, 2015; Maier et al., 2016; Marriott & Teoh, 2012b; Rust et al., 2003). Conforming to the last six NSSs, the results show that student satisfaction scores for both assessment and feedback were below other aspects of students' experiences in HE. However, although there have been several attempts to boost assessment and feedback; they have ignored a number of the main challenges long-faced by HEIs. For example: 1) mass education; 2) modularisation and semesterisation; 3) student consumerism; 4) huge cuts of public funding, and 5) digital natives in the digital age, are among these challenges (Marriott & Teoh, 2012b, p.4; see, also, Wollscheid et al., 2016).

Responding to these five challenges and long-faced by HE educationalists, technology may well be accustomed highlight the advantages and challenges of adopting CBAF in T&L in HE. CBAF, therefore, offers another method to traditional assessment and feedback ones. Students work on assignments/exams as well, however, their files are marked via virtual learning (VLE) surroundings instead of a paper-based assignments/exams and hand-written feedbacks. CBAF is pre-designed and developed by the module leader/course director and so created, delivered and marked using a computer (Debuse & Lawley, 2016; Kim, 21015; Li & De Luka, 2014; Marriott and Teoh, 2012a, 2012b; Wong, 2009).

In practice, the first time CBAF was introduced in 2013, was for the mid-term test of Advanced Financial Reporting Module. Previously, the mid-term test was a paper-based one, taken in one lecture theatre with all students sitting the test at the same time. As seen in Table 1: Panel A, the outcome of this test was that there was a very high failure rate. Out of 99 students, 50 failed and 49 passed. The average mark for females was 50%, comprising 52% for the UK and 48% for international. For male students, the average was 57% for the UK students and 51% for international students. Marks were released to the students after a month with no feedback. In 2013, the CBAF was introduced and there was a significant improvement in the results with no-one failing. In terms of differences between the UK and international students, there was 6% difference with UK students scoring on average slightly higher, with no difference between the highest marks of both cohorts (see, Table 1: Panel B). However, there was a significant difference between the two regarding the lowest marks. The international mark was 23 percentage points below the UK lowest mark. In the latest round of assessment for the same module, the overall results were

explained in Table 1: Panel C. For example, out of 96 students 92 passed and 4 failed. For home students, the average mark was 64, compared to 60 for international ones. For the Male /Female distribution, International male students achieved slightly better results whilst international female student attainment was slightly worse. This indicates that CBAF helps to reduce the attainment gap between the UK and International students in this model. Thus, it is an aid to the challenges of meeting the needs of diverse digital natives.

Table 1: The effect of Computer-Based Assessment and Feedback on Student Outcomes

Advanced Financial Reporting Module (Level 6):	Home	International	Difference
Panel A: Paper-based Test 2012			
Pass: 50 students (51%)	N/A	N/A	N/A
Fail: 49 students (49%)	N/A	N/A	N/A
Average Mark:			
Male:	57	51	6
Female:	52	48	4
Panel B: Computer-based Assessment & Feedback 2013			
Pass: 98			
Fail: 0			
Average Mark:	80	74	6
High Mark:	95	95	0
Low Mark:	65	42	23
Median Mark:	80	75	5
St-Deviation Mark:	8	11	3
Male Average Mark:	50	50	0
Female Average Mark:	54	54	0
Panel C: Computer-based Assessment & Feedback 2016			
Pass Students:	36	56	N/A
Fail Students:	2	2	N/A
Average Mark:	64	60	4
High Mark:	88	86	2
Low Mark:	29	28	1
Median Mark:	64	60	4
St-Deviation Mark:	9	13	4
Male Average Mark:	63	65	-2
Female Average Mark:	59	56	-3

The possibility to improve considerably the T&L process and its outcomes for educators and their diverse learners in a wide selection of programmes using technology in both assessment and feedback has been stated (e.g., Joint Information Systems Committee, 2007; Marriott & Teoh, 2012a ; Whitelock & Brasher, 2006; Wong, 2009). By making innovative e-assessment and e-feedback practices, learners'

engagements and motivations will be enhanced (Bostock, 2004; Debuse & Lawley, 2016; Wong et al., 2001). They will be able to know their weaknesses and strengths, evaluate their progress and enhance their study skills (e.g., Aisbitt & Sangster, 2005; Holcomb & Michaelsen, 1996; Lews & Sewell, 2007; Mansour, 2014; Marriott, 2009; Marriott and Lau, 2008; Race, 2005).

General Assessment Theory

Learning and assessment are concerned with educators and learners who are largely variable and as a result there is a good potential for uncertainty in this area (Rovai, 2000). As Dressel (1983, p. 2) pointed out that "A grade is an inadequate report of an inaccurate judgment by a biased and variable judge of the extent to which a student has achieved an undefined level of mastery of an unknown proportion of indefinite materials." Accordingly, such description suggests that assessments may be unbelievable, biased, and debatable. However, there are six key principles of general assessment theory with which most educationalists would agree. According to these six principles, assessment is (Rovai, 2000, pp. 142-143): 1) an integral and on-going side of T&L; 2) the process of gathering, describing, or quantifying data concerning learner performance; 3) the awarding of grades by educational practitioners' exploitation in summative assessments; 4) summative to be used for promotion, placement, certification, and accountability; 5) formative aiming to improve T&L method, to not grade students, and 6) not a one-dimensional measure (traditional assessment) including unseen paper-based tests, but it is a multitrait-multimethod (diverse assessment) using a number of variables and techniques including essays, assignments, projects, portfolios, e-assessments, and closed-book exams (see, Anderson et al., 1975; Hermam et al., 1992; Li & De Luka, 2014; Rovai, 2000).

To sum up, tutors ought to assess learners' progress using different types of assessments as no single assessment task will ascertain whether all standards are met (Anderson et al., 1975; Rovai, 2000). These numerous and varied assessments may be a keystone to help tutors with an honest view of what learners understand and may have a neutralizing effect in the long run. Comparing to old assessment paradigms, a multiple assessment one is needed to create valid, credible, and honest data concerning students' performance and progress. As a result, the ***e-assessment-feedback*** is one in this entire multiple assessment paradigms to measure the

accomplishment and monitor the performance of our ***"Diverse Net Generation"*** in the ***"Digital Age"*** within the ***"T&L beyond the classroom context"***.

ACTION RESEARCH METHODOLOGY AND METHODS

Action Research: What & Why?

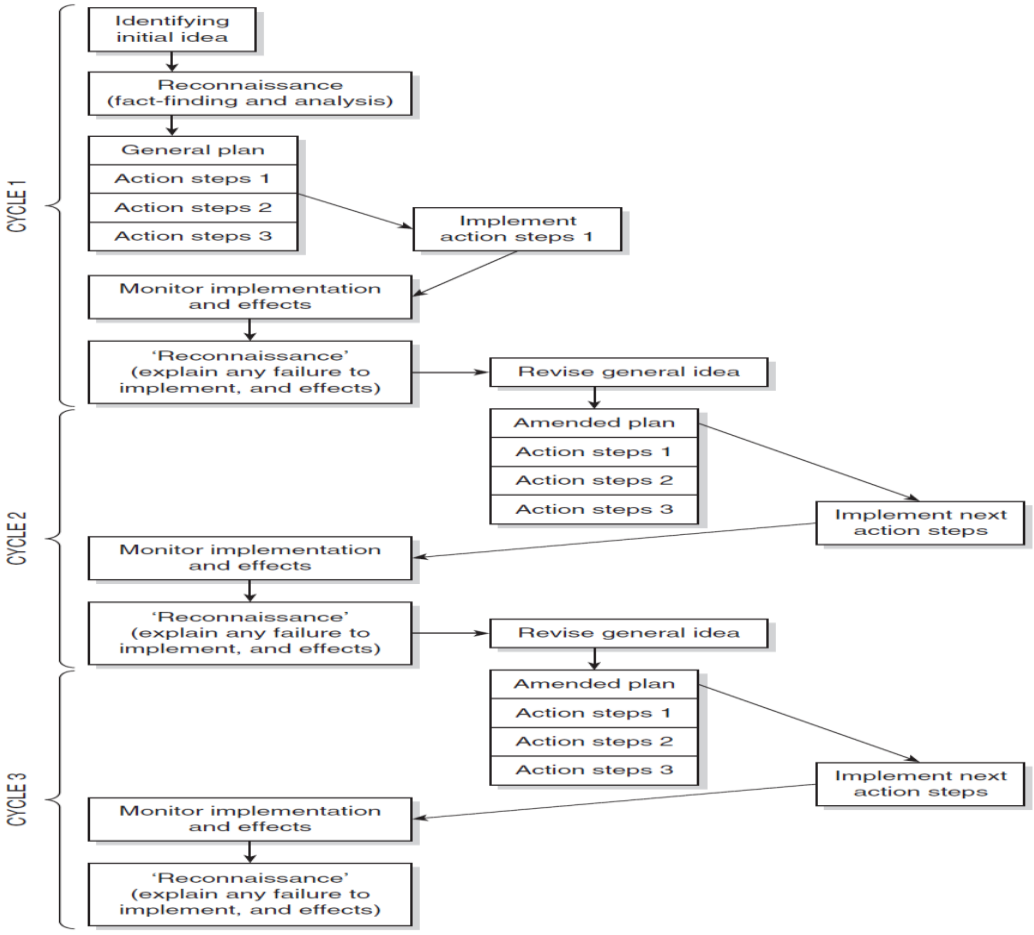
According to Hughes (1997), AR is not a single approach, but rather a combination of multiple methods and acting on it to change existing practices at the same time. Whereas Elliott (2001) says that AR projects aim to improve practice rather than to add a contribution to knowledge by linking the gap between research and practice. This links with Norton's and O'Brien's definition of AR as a pedagogical work:

> *"The fundamental purpose of pedagogical action research is to systematically investigate one's own teaching/learning facilitation practice with the dual aim of modifying practice and contributing to theoretical knowledge. Using a reflective lens to look at some 'problem' or initiative and then determining a methodical set of steps to research that problem/initiative and to take action" (Norton, 2009, pp. xv-xvi).*

> *"Action research aims to contribute both to the practical concerns of people in an immediate problematic situation and to further the goals of social science simultaneously" (O'Brien, 2001, p. 2).*

In line with these purposes, AR concerns actors, those professionals carrying out their works (e.g., Educators, Managers, Doctors and Policymakers) from day to day and aims to understand and to improve those works. For example, AR in education is grounded in the working lives of educationalists, as they practise them. Carr & Kemmis (1986) assert that AR is about improving practice, understanding of actual practice, and the situation in which the practice takes place. In the same vein, Kember (2000) claims that an AR project is concerned with social practice, improving current T&L methods and encompasses active contributions by participants. In such a systematic AR project a smooth transition from: a) project planning; b) intervention(s); c) observing how the interventions have affected the participants to d) project reflection is required (Kember, 2000; see, also, Kember and Young, 2006). As stated in Figure 2 below, these 4 steps can be further extended using Lewin's Model into identifying a general idea, reconnaissance, general planning, developing the first intervention, implementing it, evaluation, revising the plan, then repeating the above steps (Elliott, 1991; see, also, Cohen et al., 2011).

Figure 2: Elliott's Action Research Model



Source: Elliott (1991, p. 71).

AR, therefore, is a practical methodology to the professional investigation in any social situation (Cohen et al., 2011). O'Brien (2001) states that there are three main AR models proposed to investigate real professional practices and to change existing situations:

1. ***Positivist AR-*** *objective reality where knowledge is gained from data that can be independently verified.*
2. ***Interpretive AR-*** *social sciences' reaction to positivism, belief in a socially constructed subjectively-based reality, influenced by culture and history; researchers still interpret the data.*
3. ***Praxis AR-*** *belief that knowledge is derived from practice and practice is informed by knowledge, in an on-going process; action researchers holding this view reject the notion of researcher neutrality, understanding that the most active researcher is often one who has most at stake in resolving a problematic situation.*

For the current research, an interpretive AR method was conducted by interviewing a sample of the "Net Generation HE students" we teach at a British University where they study Accounting and/or relevant Business degrees. With regard to the use of CBAF in the T&L process, it would be very difficult to evaluate the perception and effectiveness of using CBAF without the involvement of students in the AR process. These students, therefore, were believed to be representative of current HE students. In this AR project, 44 students (10% of students studying accounting modules) were interviewed or shared in the focus group to assess their perceptions of the use and effectiveness of CBA and/or CBF in the T&L process.

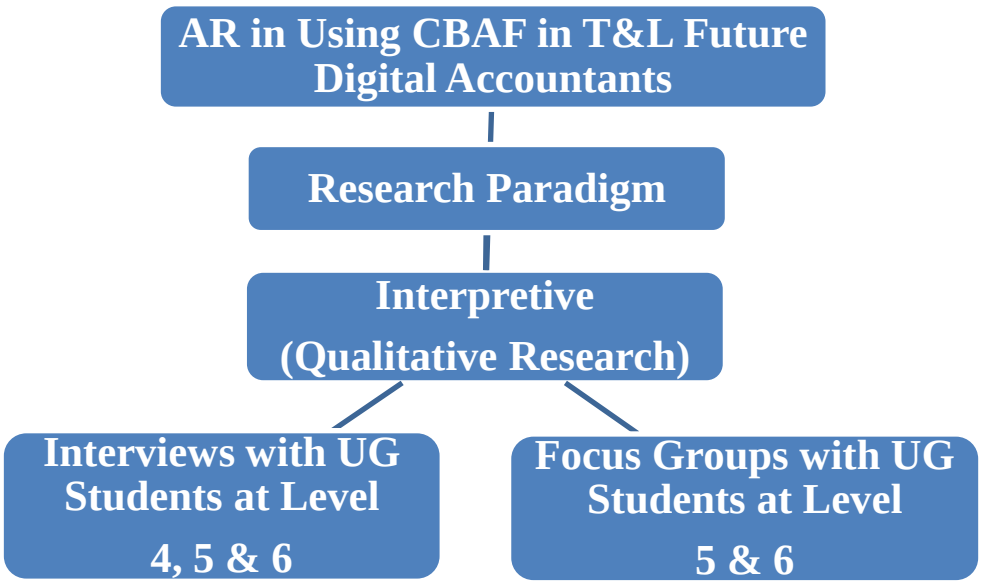
Action Research Sample and Methods

The AR sample includes all UG accounting modules which used CBAF in teaching and learning process, namely:

1. Accounting Principles (Level 4): 203 Students
2. Intermediate Financial Accounting (Level 5): 169 Students
3. Advanced Financial Reporting (Level 6): 77 Students

The data collection methods, as seen in Figure 3 below, are now chronologically outlined with comments on what was informing their structure and content.

Figure 3: Action Research Paradigm



Interviews and Focus Groups

To recruit students for the interviews and focus groups, the 449 UGs studying Accounting modules, which used CBAF, were invited with an aim to achieve maximum diversity in the three-year levels, gender, language, ethnicity, age group, etc. As seen in Table 1, the researchers completed an interview with 18 students (10 Y2 students and 8 Y3 students) in the two focus groups sessions and 26 semi-structured interviews (7 Y1 students, 19 Y2 students, and 18 Y3 students).

26 semi-structured interviews were undertaken with UG students during February-April 2016. Each interview took around 45- 60 minutes and provided a relaxed context within which students could talk about their experience and perceptions of using CBAF, and an opportunity for the interviewer to prompt for elaborations and explanations. Two focus groups were undertaken with UG students in April 2016. Each one lasted approximately 60- 90 minutes with 18 students. The researchers interacted directly with respondents, obtained clarification of responses, asked to follow-up questions and probed their responses. The open response format of the interviews and focus groups allowed the researcher to obtain constructive and rich data in the respondents' own words. Using this data the researchers were able to obtain deeper levels of meanings, perceptions, make important connections, and ascertain subtle shades in expression and meaning (Belal, 2011; Rowley, 2012; Stewart, 2006).

Both focus groups' and interviews' themes centred on an exploration of student perceptions of CBAF, student preferences of CBA and CBF, current practice in CBAF and barriers to effective CBAF. Questions included:

Q1. What do you understand CBAF to be?
Q2. What types of assessment and feedback do you like?
Q3. What types of assessment and feedback do not you like?
Q4. How long should a CBA last?
Q5. How much feedback do you need?
Q6. How important is the timing of feedback for you? Why?
Q7. How do you use feedback? Why?
Q8. Describe your experience of CBA and what makes it effective.
Q9. Describe your most desirable form of feedback and what makes it effective.

The semi-structured interviews and focus groups were led by the second author while the first one took notes and transcribed for subsequent analysis. For coding both semi-structured interviews' and focus groups' transcripts, a manual systematic analysis of concept identification was used by going through each transcript line by line Davis & Hughes, 2014). By doing so, common themes from these transcripts were identified through the analysis of concept identification by the first author (see, Cohen et al., 2011; Davis & Hughes, 2014). This systematic analysis involved a careful and close reading of the transcripts to focus on comparative perceptions and thoughts through the pooling and comparison of quotations. Generalisations across interviewees are necessary; however, it is important to consider the individual's unique thoughts are not missed. Finally, following a reiteration of the systematic analysis through broad headings, interviewees' profiles, it was possible to identify the key themes and storylines of CBA/CBF perceptions. The data collected from the focus groups and answers to the semi-structured interviews' open-ended questions were discussed and supported by evidence from the literature (Cohen et al., 2011; Davis & Hughes, 2014).

Ethical Issues of Conducting this Action Research

AR is known by many terms, including participatory research, collaborative inquiry, action learning, contextual AR, etc., (O'Brien, 2001). AR, therefore, is a broad methodology to research that deals with human participants as collaborators and partners rather than subjects (Khanlou & Peter, 2005; Zeni, 1998). Consequently, the researchers must pay close attention to ethical concerns when conducting their AR projects (see, for more details, O'Brien, 2001; Winter, 1996). As researchers involved in this AR project, we were very keen to be socially responsive, compassionate and reflective at all stages of the research process. Particularly, at the start of both semi-structured interviews and focus groups, we explained and/or discussed the aim of the AR, the potential benefits and risks to all research participants, the commitments required by research participants, outputs, consents, anonymity, confidentiality, and data access and storage to finally bring the AR to a productive conclusion (see, Belal, 2011; O'Dwyer, 2004; Rowley, 2012).

ACTION RESEARCH FINDINGS

Profile of Participants

Forty-four students of the cohort studying for one of the accounting modules were interviewed or participated in one of the two focus groups for the purpose of this study. The objective was to illuminate the students' perceptions and experiences of using CBA and/or CBF in T&L accounting modules. Care was taken to have diverse participants from a different year of study, university degree, gender, age, language, and ethnicity). As first, second and third-year students were included in this AR study, the analysis required a breakdown between those enrolled in an accounting degree and those in other non-accounting degrees and other demographics as presented in Table 2 below. For example, 16% of the students were the first-year while 42% were the second or third-year, and 50% of the students were enrolled in accounting/accounting and finance programmes. For 57% of students, Female was their gender; 55% were 21 years old or under; 57% of students, English was not their first language, and 45% consisted of Overseas students.

Table 2: Profile of Participants

Profile of Interviewees/Focus Groups	Year 1	Year 2	Year 3	Total
Q1. UG Degree:				
- Accounting/Accounting & Finance	3	9	10	22
- Non-Accounting/Accounting & Finance	4	10	8	22
Total (%)	**7**	**19**	**18**	**44**
Q2. Gender:				
- Male	4	9	6	19
- Female	3	10	12	25
Total (%)	**7**	**19**	**18**	**44**
Q3. Age:				
- 21 years or under	4	14	6	24
- 22- 25 years	3	5	9	17
- 26- 30 years	0	0	2	2
- Over 30 years	0	0	1	1
Total (%)	**7**	**19**	**18**	**44**
Q4. English (as a first language):				
- Yes	3	8	8	19
- No	4	11	10	25
Total (%)	**7**	**19**	**18**	**44**
Q5. Ethnicity:				
- UK	3	8	8	19
- EU	1	2	2	5
- Overseas	3	9	8	20
Total (%)	**7**	**19**	**18**	**44**

Understanding of the meaning of CBA & CBF

Students' understanding of the meaning of CBA and CBF in which both were used to assess their performance and progress and help them in their learning were a recurring theme in the interviews/focus groups. It was stated that CBA is using technology via computer to test the students' performance rather than using traditional paper-based test. Where CBF is receiving online prompt and comprehensive feedback through blackboard/VLE. For example,

> *"CBA is an assessment, i.e. a test or activity taken on an electronic device, mainly a computer and getting back your scores alongside feedback on it electronically." (22 yrs. UK Female Y1 Non-Acc)*

> *"CBA is an E-assessment which is conducted through the VLE and gives students their results instantly (except for some answers which need to be marked). CBF is an E-feedback which is sent via blackboard and allows students to access feedback whenever they want to." (21 yrs. UK Male Y2 Acc)*

""Assessments performed online with feedback via the same source." (22 yrs. Overseas Male Y2 Acc)

Another two experienced students responded in a similar fashion,

"CBA (e-assessment) is a modern way to assess students' understanding of the module by computer-based tests or assignments, and CBF (e-feedback) would be more efficient and accessible wherever whenever." (24 yrs. Overseas Female Y3 Acc)

"Assessments completed using a computer rather than conventional paper-based. Feedback for the related assessments is given through computer-based, which is normally soon after we complete the assessment" (31 yrs. UK Male Y3 Acc)

Given the unique nature of CBA and CBF and its relation with technology and the nature of the current digital generation of HE students, the above quotations reflect that the interviewees fully understand the meaning of CBA and CBF and compare the e-assessment-feedback with the traditional paper-based test and handwritten feedback reports (Debuse & Lawley, 2016; Joint Information Systems Committee, 2007; Marriott, 2009; Marriott & Teoh, 2012a; Potter & Johnston, 2006; Whitelock & Brasher, 2006; Wong, 2009).

Preferred types of assessment and feedback

The majority of the interviewees expressed the preference of online assessment and instant online feedback compared to group assignment/paper test and late manual feedback (Marriott, 2009; Marriott & Lau, 2008; Marriott & Teoh, 2012b; Potter & Johnston, 2006). For the preferred type of assessment and feedback, below are some selected common quotes made by participants,

"I like the online tests as you can do it when you want and it gives you some reassurance going into the exam. In terms of feedback, I liked the online feedback as you get it straight away." (21 yrs. UK Male Y1 Non-Acc)

"I prefer E-assessments which include short questions or MCQs because they have always enabled me to learn more and better. Moreover, instant and detailed E-feedback-feedforward is preferable, just like we had for this module (Accounting principles) because it helps me to understand correct solutions to the wrong answers that I may have given whilst it is still fresh in my mind." (22 yrs. UK Female Y1 Non-Acc)

"Of course online test and timely and detailed online feedback." (20 yrs. Overseas Male Y2 Non-Acc)

"Online numerical/multiple choice questions so I don't have to wait for results. Instant feedback with answers and explanation." (19 yrs. UK Male Y2 Acc)

"Most prefer to e-assessment and this type of e-feedback. It doesn't need to wait for few weeks and get the result from the school office. This is more convenient." (23 yrs. Overseas Female Y3 Acc)

"E-assessment-feedback, since the feedback is instant and the anxiety of waiting for essay result is non-existent." (21 yrs. EU Male Y3 Acc)

Similarly, an experienced 3-year overseas student support the above quotes by saying that,

"Online test with an immediate feedback for mid-term assessment is my favour type, it urges us to revise the knowledge that we learn and understand the theories and calculation, instead of just put everything into the last week to the exam." (24 yrs. Overseas Female Y3 Acc)

However, some participants strongly opposed the use of CBA and CBF saying,

"I don't like computer-based tests and its remote feedback. I like writing assignment/essay questions and face-to-face personal feedback." (21 yrs. UK Male Y2 Acc)

"I hate technology and therefore I dislike online assessments and feedback. I preferred group assignment and presentation" (22 yrs. Overseas Male Y2 Acc)

"I do not like computer-based assessments with lengthy computational calculations" (20 yrs. EU Female Y2 Acc)

"Personally, I don't enjoy online multiple choices. I'm more likely to perform better working out answers for myself rather than ruling out options on the computer. I don't like to guess either, as I don't like to leave things down to luck. Where there are more parts to one question there should be an error carried forward opportunity. For feedback, I'm more likely to ignore it on the computer rather than if it's handed to me" (23 yrs. UK Female Y3 Acc)

Thus, the above views confirm that almost all students preferred e-assessment-feedback to assess their performance and give them timely feedback on what they did well/bad and how to correct their mistakes for future assessments.

Ideal duration of CBA

With regard to the proper length of CBA, almost all interviewees have a general consensus about the right length of time for each CBA. Some interviewees put their preferred duration of CBA in this way:

"I liked having the full hour as I felt like I didn't have to rush through and could go back to questions if I needed. Having said that I didn't actually use all of the time – only around 45 minutes – but I like having the extra time there anyway." (21 yrs. UK Male Y1 Non-Acc)

"1 hour." (19 yrs. Overseas Male Y1 Acc)

"Depends on how long the test is, but the full hour is helpful to not be put under a time pressure." (19 yrs. UK Female Y2 Acc)
"45 minutes- 1 hour." (23 yrs. Overseas Female Y2 Acc)

"I would say that 50 minutes to one hour is a reasonable length of time for a computer based assessment." (20 yrs. UK Female Y2 Acc)

Likewise, almost third-year students also strongly supported the above quotes, as follows,

"Depends on the content of the assessment. Anyway, at least 1-hour." (20 yrs. UK Female Y3 Acc)

"It depends, but at least 45 minutes to 1-hour is good." (23 yrs. EU Female Y3 Non-Acc)

"Depend on the number of the question and the degree of difficulty of the questions, normally 1-hour." (25 yrs. Overseas Male Y3 Acc)

To sum up, the vast majority of participants believed that the duration of a CBA should be between 45 and 60 minutes. This conclusion is consistent with the previous relevant literature (e.g., Loewenberger & Bull, 2003; O'Connell et al., 2010).

Ideal amount and content of CBF

Another interesting theme emerging from interviewees' and focus groups' data was related to students' views about the ideal extent and content of CBF reports (Mansour, 2014, 2015; Marriott & Teoh, 2012a,). The majority of interviewees expressed the opinion that they need comprehensive CBF on both correct and incorrect answers, as follows,

"For online test, I like getting back feedback on all of the questions (not just what I got right – some questions I got right but wasn't 100% sure if my method was accurate) -including the method and references to resources where I can revise that topic, going through it in lectures afterwards can also be useful too." (21 yrs. UK Male Y1 Non-Acc)

"Full feedback on my assessment and feedback on all the answers and showing how to work out or to answer that question." (19 yrs. Overseas Male Y1 Acc)

"Enough to know where I specifically went wrong and right and what I specifically need to do/read to improve your performance." (20 yrs. UK Female Y2 Acc)

"Detailed feedback-feedforward on every single question." (23 yrs. Overseas Female Y3 Acc)

"Much more details about what cause the grade high or low, if low, how to improve it." (22 yrs. EU Female Y3 Acc)

"Enough to tell me my strengths and weaknesses and how to correct these weaknesses in the future" (31 yrs. UK Male Y3 Acc)

However, a number of second and third-year interviewees opposed the idea of providing detailed feedback on both correct and incorrect answers. They preferred short and focussed feedback on mistakes and how to correct them, as follows,

"I only require feedback on the questions that I answered incorrectly in order for me to see where I am going wrong and references to correct them." (20 yrs. UK Female Y2 Non-Acc)

"From past experience with received feedback reports, I would say that 2-3 paragraphs provide a sufficient amount of help to correct wrong answers and room for future improvement." (19 yrs. UK Female Y2 Acc)

"Short and concise feedback on incorrect answers." (22 yrs. Overseas Male Y2 Acc)

"Probably a paragraph or two summarise my mistakes and how to correct them in the future." (18 yrs. EU Male Y2 Acc)

"Sufficient to understand where I went wrong and resources or points on how to improve." (20 yrs. UK Female Y3 Acc)

"A clear and fair explanation of why I did wrong is enough for me." (24 yrs. Overseas Female Y3 Acc)

While, only interviewee favoured very short feedback:

"A sentence or two would suffice. Not too much so that it is not feasible to include in a computer-based assessment, but enough to indicate to us where we went wrong, and the right way to go about it." (20 yrs. UK Female Y2 Acc)

Finally, only one sceptical interviewee pointed out the limited usefulness of feedback:

> *"Seeing score is enough for me." (24 yrs. Overseas Female Y3 Non-Acc)*

In brief, almost participants of this AR appreciate their need of comprehensive CBF on both correct and incorrect answers with references to additional reading (i.e., feedback-feedforward report). This supports findings from previous studies (see, Debuse & Lawley, 2016; Marriott & Teoh, 2012b; O'Connell et al., 2010).

Importance of the timing of receiving feedback

Assessment and feedback literature shows a strong preference by students for instant feedback (see, Mansour, 2014, 2015; O'Connell et al., 2010). Most of the interviewees saw the importance of receiving instant feedback on their tests/assignments. For example,

> *"The timing of feedback is very essential. The instant feedback is preferable because it helps to understand and rectify our mistakes when it is still fresh in our minds." (22 yrs. UK Female Y1 Non-Acc)*

> *"The quicker the feedback the better because that allows me more time to practice my areas of weakness and time to absorb new knowledge." (19 yrs. UK Male Y1 Acc)*

> *"Timing of feedback is very important because the sooner you receive feedback, the more earlier you could work on your mistakes." (19 yrs. Overseas Male Y1 Acc)*

> *"Preferably quite soon after submission/ASAP because it gives me room to improve and find ways to improve before exams or any other up-and-coming assessments." (19 yrs. UK Female Y2 Acc)*

> *"Prompt feedback is very important because I might not remember the questions and my answer of the tests if feedback is given a week later." (23 yrs. Overseas Female Y2 Non-Acc)*

> *"...I do not like late feedback as long as it is provided at least 3 weeks before the exam (ideally 4 weeks). So, the prompt e-feedback is the ideal solution." (21 yrs. UK Female Y3 Acc)*

Most of the experienced third-year students responded in a similar fashion,

> *"I like to receive feedback report as soon as possible because it is important I can make up where I did not do well before the final exam." (23 yrs. Overseas Female Y3 Non-Acc)*

"It is useful getting feedback instantly, in that any mistakes can be corrected. Instantly, prevents bad habits forming to an extent." (21 yrs. UK Male Y3 Acc)

"Instant feedback is very important, because it puts me at peace of mind, and helps me work out how well I need to do in exams, etc." (21 yrs. UK Female Y3 Acc)

In contrast, only two interviewees favoured late feedback:

"I like to have feedback after a couple of weeks or closer to exams when I can go over my mistakes by myself and preparing final revision before final exams." (20 yrs. UK Female Y2 Acc)

"Feedback given immediately is good but not always practical for the marker/lecturer as I well imagine they are busy people. So I'd say feedback given back two/three weeks after submission is a good window of time. Closer to exam time I think I'd prefer receiving feedback closer to exam time as that's the time in the semester where everyone's revising and going over the lecture/problem class material." (18 yrs. UK Male Y2 Non-Acc)

Another interviewee pointed out the limited importance of instant feedback:

"Swift feedback is not of much importance for me. I will do my best anytime, from week 1 to week 12." (20 yrs. Overseas Male Y2 Acc)

Given the importance of feedback and its timing to students, the above quotations support instant feedback as a tool to help students to know their strengths and weaknesses and how correct them before the next assessment (Debuse & Lawley, 2016; Mansour, 2014, 2015; O'Connell et al., 2010). The participants also highly appreciated the immediacy of the constructive CBF combined with CBA of their accounting modules (see, also, Van der Kleij et al., 2015).

Use of received feedback

With regard to the use of feedback reports, below are several comments made by participants that reveal their usage of feedback reports:

"I use feedback as a determinant of what level I am currently working at compared to which level I would prefer to be working at and this helps me to plan my learning and gives a focus for my revision." (19 yrs. UK Male Y1 Acc)

"I read all feedback and reflect on it so I could improve for future reference for example e-assessment feedback will help me on my paper exams." (19 yrs. Overseas Male Y1 Acc)

"I use feedback to update my notes and use it as a pointer to where I need to practise and improve my progress." (20 yrs. UK Female Y2 Acc)
"I use any advice and negative feedback given to try and find a way to improve and allow less room for the same critiques to be made a second time." (19 yrs. UK Female Y2 Acc)

"As revision guidance for future assessments/exams." (22 yrs. Overseas Male Y2 Acc)

Similarly, third-year students support the above quotes, as follows,

"To correct any misunderstanding of topics, to ensure I don't make the same mistake in the exam." (21 yrs. UK Male Y3 Acc)

"...for me the most important thing of using feedback is that I understand my mistakes that next time I can answer correctly." (23 yrs. EU Female Y3 Non-Acc)

"I use feedback to identify my weaknesses to ensure I know what to work on. I assume most students compare feedback so I know where I stand in line with others." (23 yrs. UK Female Y3 Acc)

To summarise, Student participants used feedback reports in different ways, for example, to assess their performance; a tool for improving this performance, constructive comments on their strengths and weaknesses, to revise from and prepare for final exam and how to improve their learning styles, etc., (Evans, 2013; O'Connell et al., 2010; Van der Kleij et al., 2015).

Experience of taking CBA and what makes it effective

The use of CBA is one of the fastest growth areas in HE today (Marriott, 2009; Parshall et al., 2000; Rovai, 2000). Increasingly, tutors and students are stating that electronic assessment not only facilitates the process of assessing performance and but also assists with considering student diversity in the digital age (see, Aisbitt & Sangster, 2005; Belal, 2011; Bostock, 2004). For the experience of CBA, below are some selected common quotes made by student participants:

"I am fond of online assessments because they prompt you to think fast since there isn't much writing involved and to be quite honest, they are exciting since the feedback is instant. I am not an accounting person, but the way I was taught and assessed made me like doing accounting and taking computer-based tests." (19 yrs. UK Male Y1 Acc)

"The experience of an online assessment was great because of the way it was designed and marked and given feedback on all questions and references for revision." (22 yrs. UK Female Y1 Non-Acc)

"It has always worked well for me and I like being able to easily review answers as I go along. I also like being able to see what result I got straight away and feedback on my answers." (21 yrs. UK Male Y2 Acc)

"I've a good experience of taking online tests this year and last one as well. Overall, I am satisfied with taking such kind of test compared to paper-based test/assignment." (20 yrs. Overseas Male Y2 Non-Acc)

"I have a good experience of taking computer-based test as I have done the ones for accounting, ones for econometrics and portfolio choice. It is best way to meet our needs as a digital generation." (19 yrs. UK Female Y2 Acc)

"I've had an overall good experience with online assessments and I think it is most effect when the questions are worded simply and straight-forward in terms of how they're worded." (20 yrs. UK Female Y2 Acc)

"Last year I have done an online assessment exam in library. It is very quick to get result and feedback, so I did not need to wait a long time to worry about my result. And it very helpful with my final exam." (23 yrs. Overseas Female Y3 Acc)

"My experience of online assessments has been good, effective because they are user friendly and feedback is provided instantly." (21 yrs. UK Female Y3 Acc)

"Tends to do better on the online assessments and the instant result and feedback is very useful and helps reduce the stress of waiting for results." (20 yrs. UK Female Y3 Acc)

"Computer-based test is much more convenient and I really like the immediate score checking." (24 yrs. Overseas Female Y3 Non-Acc)

"It is new for me and I always do better than the paper class test." (25 yrs. Overseas Male Y3 Acc)

In response to the challenges created via a wide diversity of students and within a digital learning environment, the HE sector needs more cost-effective and pedagogically acceptable combinations of assessment methods to solve these challenges (Loewenberger & Bull, 2003; Potter & Johnston, 2006). With traditional paper-based assessment and economic reductions in the staff-student ratio possibly leading to a reduction in the quality of the assessment experience (Maneekhao et al., 2006). The challenge now is to find out how to improve the quality and efficiency of

CBA? To answer this question, student participants made some suggestions, as follows,

> *"...what makes it more effective is the way of teaching the module and make things rather interesting and easy for us by explaining its structure in class by giving examples and mock test." (22 yrs. UK Female Y1 Non-Acc)*

> *"...more mock online tests to be more effective." (21 yrs. UK Male Y2 Acc)*

> *"...for me online assessments are effective as they allow for a quick assessment. It's all linked directly with my VLE account so there's no messing around if you've forgotten my ID card. Also my feedback is straight to my VLE. Also I don't have to wait for an email from the undergraduate office for my results and feedback to be made available." (20 yrs. UK Female Y2 Acc)*

> *"...it is effective as it's handy for us to do it where/when we want while still effectively testing us." (19 yrs. UK Female Y2 Acc)*

> *"...for CBA to be effective, I need more online mock and informal tests." (20 yrs. Overseas Male Y2 Non-Acc)*

> *"...using a specific number of topics (be closely related to the practice of lectures and tutorials) would be effective for me to complete on-line assessment and this module and even having a thorough understanding of the subject." (Y3 student)*

To conclude, the student interviewees highly valued the good experience they gained from taking CBA rather than paper-based tests for assessing their academic progress. This conclusion supports the previous CBA literature (e.g., Aisbitt & Sangster, 2005; Belal, 2011; Bostock, 2004; Marriott, 2009; Parshall et al., 2000; Rovai, 2000). Regarding the efficiency of using CBA, the interviewees suggested that tutors should provide guided CBA instructions mock CBAs, and timely feedback (see, Loewenberger & Bull, 2003; Maneekhao et al., 2006; Potter & Johnston, 2006; Wollscheid et al., 2016).

Preferred format of CBF and what makes it effective

Regarding the wide range of feedback types (e.g., handwritten, face-to-face, generic or online feedbacks), the use of CBF is one of the fastest growth areas in HE today (Mansour, 2015; Rowe & Wood, 2008). Increasingly, tutors and students are finding that electronic feedback not only speeds up the delivery of feedback and aids the effectiveness of reception of feedback, but also assists with generating appropriate

evidence for the quality of given feedback (Mansour, 2015; O'Connell et al., 2010). In doing so, the student participants stated their best format of CBF below:

> *"Blackboard/VLE feedback is most desirable for me as it enables students to view their own feedback remotely and allows them to access feedback whenever they want to." (21 yrs. UK Male Y2 Acc)*

> *"…instant and detailed online feedback is preferable, just like we had for this module (Accounting principles), because it helps me to understand correct solutions to the wrong answers that I may have given whilst it is still fresh in my mind." (22 yrs. UK Female Y1 Non-Acc)*
> *"…for me online feedback is efficient. I liked it and satisfied as soon as it clearly said where should I improve or which part is my weakness." (24 yrs. Overseas Female Y3 Acc)*

> *"The most desirable form of feedback is quick and comprehensive feedback with references to review for the final exam" (21 yrs. UK Female Y3 Acc)*

While only two interviewees preferred personal or face-to-face feedback saying,

> *"I prefer Feedback given in person, online feedback can be confusing at times, any queries regarding feedback can be answered in person instead." (22 yrs. Overseas Male Y2 Acc)*

> *"One to one personal feedback it improves the relationship with the pupil and tutor and allows me to ask questions if there is anything I do not understand." (20 yrs. UK Female Y2 Acc)*

With regard to improving the efficiency of current practice of CBF, student participants made some recommendations, as follows,

> *"The online feedback is effective when it helps me to know what topics I need to revise more going into the exam supported by suggested references." (21 yrs. UK Male Y1 Non-Acc)*

> *"Effective feedback means written down answers and what you put and maybe why what you put is wrong or worked out solutions. From this, I can learn and understand my mistakes." (21 yrs. UK Female Y2 Acc)*

> *"…my most desirable form of feedback would be a list of pros and cons for my assessment/test and potentially areas of the module I should do extra revision on with helpful references to textbooks or other resources that may help me in these specific areas." (19 yrs. UK Male Y2 Acc)*

> *"Effective feedback is prompt, accessible and constructive feedback which presents the good point(s) and bad point(s)." (18 yrs. Overseas Male Y2 Acc)*

> *"I need a feedback report which tells me how to correct these wrong answer in the future and to recommend some references to read to overcome my mistakes in the future." (20 yrs. Overseas Male Y2 Non-Acc)*

> *"The feedback is most effective when my learning process continues when I go through the feedback." (23 yrs. EU Female Y3 Non-Acc)*

In summary, the vast majority of student interviewees highly preferred the instant and detailed online feedback with references to review for the next assessment. This result is consistent with the results of previous studies (see, Mansour, 2015; O'Connell et al., 2010). For enhancing the efficiency of CBF, they highly recommended the continuity of providing timely and constructive CBF and face-to-face feedback as well.

CONCLUSION

Key Findings

In the digital age, traditional paper-based assessments and hand-written feedback are not the ideal learning methods for ***"the current diverse Net Generation of student and "the Teaching Beyond the Classroom Context"***. The HE literature review documented the usefulness of using technology in the T&L environment to both lecturers and students compared to traditional assessment and feedback practices. This AR, therefore, aimed to investigate the perception of students of the development and use of CBA and/or CBF in accounting education and to shed light on the current practice of using technology in T&L in HE to raise awareness of good practice. To achieve these aims, a qualitative approach was used; semi-structured interviews and two focus groups with 44 UG students who agreed to take part and reflect their CBA/CBF experience.

Diverse participants highly ranked the importance and benefits of using CBA and CBF in T&L environment. The focus groups went well and commented on the CBA/CBF being a great approach for teaching and assessing them. Finally, AR findings supported the proposition that CBA/CBF can definitely provide an effective supernumerary assessment and feedback approach for HE business UG students who are indeed ***"Diverse Digital Natives"***. Our all overall objective was to achieve a discipline-wide improvement in CBA and CBF in accounting and non-accounting

programmes. These findings are consistent with previous relevant education literature's findings (e.g., Aisbitt & Sangster, 2005; Boyce, 1999; Debuse & Lawley, 2016; Holtzblatt & Tschakert, 2011; Jebeile & Abeysekera, 2010; Loewenberger & Bull, 2003; Marriott, 2009; Marriott & Teoh, 2012a; O'Connell et al., 2010; Potter & Johnston, 2006).

The following outcomes of this AR were helpful to achieve the above aims:

I. A comprehensive education literature identifying the use of CBA and/or CBF in teaching HE students;

II. A comprehensive scoping of the current practice of using CBA and/or CBF in teaching Accounting modules and present levels of students' agreement and satisfaction, and

III. A comparison of students' perceptions, at the three-year levels, of the attributes of effective CBA and/or CBF.

The AR question: ***"How do students assess the use of CBA and/or CBF in T&L accounting modules?"*** was answered through the thematic analysis of student interviews and student focus groups. On the one hand, both student interviewees' and focus groups' findings suggest that the majority of student participants preferred working online CBA rather than paper-based exams. Most of them were satisfied with the use of CBA in assessing their performance, its structure, and prompt announcing of marks, etc. Regarding the proper duration of CBA, there is a general agreement among Y1, Y2 & Y3 students that CBA time should be between 45 and 60 minutes. On the other hand, the majority of student participants expressed their need for instant and detailed CBF on both correct and incorrect answers. There is a general consensus among the participants that they used CBF to assess their performance and to know their strengths and weaknesses, and to how to revise to the next assessment. Finally, they appreciated CBF compared to traditional late hand-written feedback. These results are consistent with previous relevant education literature's findings (see, for more details, Aisbitt & Sangster, 2005; Debuse & Lawley, 2016; Kim, 2015; Loewenberger & Bull, 2003; Marriott, 2009; Marriott & Teoh, 2012a; O'Connell et al., 2010).

Key Recommendations to *HEIs for Future Use of CBAF in T&L Practice*

Assessment is the process of assessing students' knowledge, understanding, abilities, and skills while feedback is the way in which tutors measure and comment on

students' performance and then communicate this feedback to students (Marriott and Teoh, 2012b). Additionally, recent NSSs show that assessment and feedback at HEIs have been considered by students to be an area of weakness. Responding to these concerns, many HEIs have introduced innovative assessment and feedback practices. One of these innovative practices, the use of CBA and/or CBF (see, Aisbitt & Sangster, 2005; Debuse & Lawley, 2016; Evans, 2013; Kim, 2015; Li & De Luka, 2014; Loewenberger & Bull, 2003; Mansour, 2014, 2015; Marriott & Teoh, 2012a, 2012b; O'Connell et al., 2010; Van der Kleij et al., 2015). As a result of the work we have undertaken in this AR, we would suggest the following recommendations to improve the current practice of using CBA and CBF, as follows:

A- For improving the efficiency of the current practice of CBA:

1. Provide a complete description of the exam structure and questions;
2. Provide a variety of questions' styles;
3. Provide mock/informal exams, and
4. Set a proper duration of CBA.

B- For improving the efficiency of the current practice of CBF:

1. Provide a mixed form of feedback-feedforward including CBF, personalised and face-to-face feedback;
2. Provide prompt and detailed feedback-feedforward on errors/mistakes with a guidance to correct them and references to be reviewed for future assessments

Limitations and Scope for Future Action Research

It is important to be aware of the main limitations of this type of AR. The first limitation is as the researchers' observations were drawn from a sample of a British university' students who are studying accounting module(s), a cautious attitude is needed in relation to interpreting the findings and their generalizability. Another limitation about the chance that interviewees might not give honest thoughts/answers to the open-ended questions since they might consider that it would affect the tutors' markings to their exams. To alleviate this concern, it was confirmed to the participants that their exams would be marked by two blind markers and they have the right to withdraw at any time from the interview/focus group. Additionally, the two researchers were very keen to create a dialogue with the student participants to build

up a collaborative discussion regarding the AR idea and how it could help both students and educators to improve the current practice of using CBA and CBF.

This AR has presented an insight into the UG students' favoured methods of assessment and feedback and how CBA and/or CBF can have a positive impact on students' engagement in the T&L environment. As explained above, the findings indicate that there is a general consensus among student participants about the importance of CBA and/or CBF in the current T&L environment. So, it could be argued considerable emphasis and research should be placed on students as co-partners with their teachers in the assessment and feedback process. Therefore, future studies might be undertaken based on a large sample using quantitative methods such as questionnaires to test whether the findings revealed in this study can be generalised statistically. Further evidence from other disciplines would add to the CBA and CBF debate and would provide evidence to establish the external validity of this AR results. Another avenue for further research could involve conducting more focus groups and interviews with staff to investigate the reasons for (not)adopting CBA/CBF in T&L modules and the potential of technology to transform the student learning experience, etc.

REFERENCES

Anderson, S., Ball, S., & Murphy, R. (1975). *Encyclopaedia of educational evaluation.* San Francisco: Jossey-Bass.

Aisbitt, S., & Sangster, A. (2005). Using internet-based online assessment: A case study. *Accounting Education 14 (4),* 383- 394.

Bayne, S., & Ross, J. (2007). *The "digital native" and "digital immigrant": A dangerous opposition.* Paper presented at the annual conference of the Society for Research into Higher Education (SRHE), Brighton, Sussex, England.

Belal, A. (2011). Students' perceptions of Computer Assisted Learning: an empirical study. *Int. J. Management in Education, 5(1),* 63-78.

Biggs, J. (2001). The reflective institution: Assuring and enhancing the quality of teaching and learning. *Higher Education 41,* 221-238.

Biggs, J. (2003). *Teaching for quality learning at university.* Buckingham: Open University Press/Society for Research into Higher Education.

Biggs, J., & Tang, C. (2011). *Teaching for quality learning at university: What the student does?* Maidenhead: Open University Press.

Bostock, S. (2004). Motivation and electronic assessment. In A. Irons & S. Alexander, *Effective learning and teaching in computing (Chap. 9, 86- 99).* London: Routledge Falmer.

Boyce, G. (1999). Computer-assisted teaching and learning in accounting: pedagogy or product? *Journal of Accounting Education, 17,* 191-220.

Brown, J. (2002). Learning in the Digital Age. *Forum Futures,* 20-23.

Brown, C., & Czerniewicz, L. (2008). *Trends in student use of ICTs in higher education in South Africa.* Paper presented at the 10th Annual Conference of WWW Applications, Cape Town, South Africa.

Brown, E., Gibbs, G., & Glover, C. (2003). Evaluating tools for investigating the impact of assessment regimes on student learning. *Bioscience Education e Journal, 2 (1),* 1-7.

Brown, S., & Knight, P. (1994). *Assessing Learners in Higher Education*. London: Kogan.

Bullen, M., Morgan, T., & Qayyum, A. (2011). Digital learners in higher education: Generation is not the issue. *Canadian Journal of Learning and Technology, 37(1),* 1-24.

Carless, D. (2007). Learning-orientated assessment: conceptual bases and practical implications. *Innovations in Education and Teaching International, 44,* 57-66.

Carr, W., & Kemmis, S. (1986). *Becoming Critical: Education, knowledge and action research.* Lewis, Falmer.

Clariana, R., & Wallace, P. (2002). Paper-based versus computer-based assessment: key factors associated with the test mode effect. *British Journal of Educational Technology, 35(5),* 593-602.

Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in Education*. Routledge Publishers: London.

Dabbagh, N. (2007). The online learner: Characteristics and pedagogical implications. *Contemporary Issues in Technology and Teacher Education, 7 (3),* 217-226.

Davies, M., & Hughes, N. (2014). *Doing A Successful Research Project Using Qualitative or Quantitative Methods.* Palgrave Macmillan: New York.

Debuse, J., & Lawley, M. (2016). Benefits and drawbacks of computer-based assessment and feedback systems: Student and educator perspectives. *British Journal of Educational Technology, 47(2),* 294-301.

Dressel, P. (1983). Grades: One more tilt at the windmill. In A.W. Chickering (Ed.), *Bulletin,* 3-21. Memphis, TN: Memphis State University, Center for the Study of Higher Education.

Elliott, J. (1991). *Action Research for Educational Change*. Buckingham: Open University Press.

Elliott, J. (2001). *Action Research for Educational Change.* Buckingham: Open University Press.

Evans, C. (2013). Making Sense of Assessment Feedback in Higher Education. *Review of Educational Research, 83(1),* 70-120.

Fanghanel, J. (2007). *Investigating university lecturer's pedagogic constructs in the working context.* Higher Education Academy: UK. Available from https://www.heacademy.ac.uk/sites/default/files/fanghanel.pdf. Accessed 7th March 2016.

Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century.* New York: Basic Books.

Gibbs, G., & Simpson, C. (2003). Does your assessment support your students' learning? *Journal of Learning and Teaching in Higher Education, 1(1),* 1-30.

Gibbs, G., & Simpson, C. (2005). Conditions under which assessment supports students' learning. *Journal of Learning and Teaching in Higher Education, 1,* 3-31.

Griffin, K., Cunningham, E., & Mwangi, C. (2016). Defining Diversity: Ethnic Differences in Black Students' Perceptions of Racial Climate. *Journal of Diversity in Higher Education, 9(1),* 34-49.

Gros, B., Garcia, I., & Escofet, A. (2012). Beyond the Net Generation Debate: A Comparison of Digital Learners in Face-to-Face and Virtual Universities. *The International Review of Research in Open and Distance Learning, 13 (4),* 190-2010.

Gurin, P., Dey, E., Hurtado, S., & Gurin, G. (2002). Diversity and Higher Education: Theory and Impact on Educational Outcomes. *Harvard Educational Review, 72(3),* 330-366.

Herman, J. L., Aschbacher, P. R., & Winters, L. (1992). *A practical guide to alternative assessment.* Alexandria, VA: Association for Supervision and Curriculum Development.

Holcomb, T., & Michaelsen, R. (1996). A Strategic Plan for Educational Technology in Accounting. *Journal of Accounting Education, 14 (3),* 277-292.

Holtzblatt, M., & Tschakert, N. (2011). Expanding your accounting classroom with digital video technology. *Journal of Accounting Education, 29,* 100-121.

Hughes, R. (1997). *What is action research?* Available from www.scu.edu.au/schools/gcm/ar/arr/arow/rintro.html. Accessed 15th June 2015.

Jaggars, S., & Xu, D. (2016). How do online course design features influence student performance? *Computer & Education, 95,* 270-284.

Jebeile, S. H., & Abeysekera, I. (2010). The spread of ICT innovation in accounting education. *International Journal of Teaching and Learning in Higher Education, 22 (2),* 158-168.

Joint Information Systems Committee (JISC). (2007). *Effective Practice with e-Assessment: An overview of technologies, policies and practice in further and higher education.* JISC Innovation Group: University of Bristol. Available from www.jisc.ac.uk/assessresource. Accessed 10th January 2016.

Joint Information Systems Committee (JISC). (2010). *Effective Assessment in a Digital Age.* JISC Innovation Group: University of Bristol. Available from www.jisc.ac.uk/assessresource. Accessed 10th January 2016.

Jones, C., Ramanau, R., Cross, S., & Healing, G. (2010). Net Generation or digital natives: Is there a distinct new generation entering university? *Computers and Education, 54 (3),* 722-732.

Juwah, C., Macfarlane-Dick, D., Matthew, B., Nicol, D., Ross, D., & Smith, B. (2004). *Enhancing student learning through effective formative feedback.* The Higher Education Academy: UK. Available from http://www.heacademy.ac.uk/resources/detail/id353_effective_formative_feedback_juwah_etal. Accessed 7th May 2015.

Kember, D. (2000). *Reflective teaching and learning in the health professions: action research in professional education*. Blackwell Science Publishers, Oxford: UK.

Kember, D., & Young, D. (2006). Characterising a teaching and learning environment conducive to making demands on students while not making their workload excessive. *Studies in Higher Education, 31,* 185-198.

Khanlou, N., & Peter, E. (2005). Participatory action research: considerations for ethical review. *Social Science & Medicine, 60(10),* 2333-2340.

Kim, J. (2015). A Study of Perceptional Typologies on Computer Based Assessment (CBA): Instructor and Student Perspectives. *Educational Technology & Society, 18 (2),* 80-96.

Kirkwood, A., & Price, L. (2005). Learners and learning in the 21st century: What do we know about students' attitudes and experiences of ICT that will help us design courses? *Studies in Higher Education,* 30(3), 257-274.

Kopáčková, H. (2015). *Characteristics of digital natives generation in the context of mobile learning.* 2015 International Conference on Information and Digital Technologies*, Zilina, 2015, pp. 155-160. Doi: 10.1109/DT.2015.7222966.*

Lewis, D. J., & Sewell, R. (2007). Providing formative feedback from a summative computer aided assessment." *American Journal of Pharmaceutical Education, 71(2),* 1-6.

Li, j., & De Luca, R. (2014). Review of assessment feedback. *Studies in Higher Education, 39(2),* 378-393.

Loewenberger, P., & Bull, J. (2003). Cost-effectiveness of computer-based assessment. *The Journal of the Association for Learning Technology, 11(2),* 23-45.

Maier, U., Wolf, N., & Randler, C. (2016). Effects of a computer-assisted formative assessment intervention based on multiple-tier diagnostic items and different feedback types. *Computer & Education, 95,* 85-98.

Maneekhao, K., Jaturapitakkul, N., Todd, R., & Tepsuriwong, S. (2006). Developing an innovative computer-based test. *Prospect, 21 (2),* 34-46.

Mansour, H. (2014). Using technology to encourage students' engagement with feedback: the Live Essay Feedback Checklist (LEFC). *The Journal of Academic Development and Education, 1,* 46-57.

Mansour, H. (2015). Enhancing first year management students' engagement: An action research project to explore the use of the Essay Feedback Checklist (EFC). *The International Journal of Management Education, 13,* 218-226.

Martinez, P. (2001). *Improving student retention and achievement: What do we know and what do we need to find out?* Learning and skills development agency: London.

Marriott, P. (2009). Students' evaluation of the use of online summative assessment on an undergraduate financial accounting module. *British Journal of Educational Technology*, *40(2)*, 237-254.

Marriott, P., & Lau, A. (2008). The use of on-line summative assessment in an undergraduate financial accounting course." *Journal of Accounting Education*, *26*, 73-90.

Marriott, P., & Teoh, L. (2012a). *ICT for assessment and feedback on undergraduate accounting modules*. The Higher Education Academy. Available from http://www.heacademy.ac.uk/resources/detail/disciplines/finance-and-accounting/using-ICT-in-assessment-and-feedback. Accessed 5th May 2015.

Marriott, P., & Teoh, L. (2012b). *Computer-based assessment and feedback: Best Practice Guidelines.* The Higher Education Academy. Available from http://www.heacademy.ac.uk/assets/documents/disciplines/finance_and_accounting/Computer-basedassessmentfeedbackBestPractice.pdf. Accessed 5th May 2015.

Norton, L. (2009). *Action Research in Teaching and Learning: A practical guide to conducting pedagogical research in universities.* London: Routledge.

Oblinger, D., & Oblinger, J. (2005). *Educating the Net Generation*. EDUCAUSE. Available from www.educause.edu/ir/library/pdf/pub7101.pdf. Accessed 7th June 2015.

O'Brien, R. (2001). An Overview of the Methodological Approach of Action Research. In Roberto Richardson, *Theory and Practice of Action Research*, João Pessoa, Brazil: Universidade Federal da Paraíba. Available from http://www.web.net/robrien/papers/arfinal.html#_Toc26184652. Accessed 9th June 2015.

O'connell, B., Ferguson, C., De Lange, P., Howieson, B., Watty, K., Carr, R., Jacobson, B., Campitelli, L., Gora, Y., & Milton, A. (2010). *Enhancing Assessment Feedback: Practices in Accounting Education: Issues, Obstacles and Reforms.* Australian Learning and Teaching Council. Available from http://www.olt.gov.au/project-enhancing-assessment-feedback-practices-jcu-2007. Accessed 10th June 2015.

O'Dwyer, B. (2004). Qualitative data analysis: illuminating a process for transforming a 'Messy' but 'Attractive' 'Nuisance'. In Humphrey, C., & Lee, B. (Eds.), *The Real Life Guide to Accounting Research*, (pp.391-407). Elsevier: Oxford.

Parshall, C., Davey, T., & Pashley, P. (2000). Innovative item types for computerised testing. In W.J. van der Linden & Glas, C., *Computerised Adaptive Testing: Theory and Practice.* Netherlands: Kluwer Academic Publishers.

Potter, B., & Johnston, C. (2006). The effect of interactive on-line learning systems on student learning outcomes in accounting. *Journal of Accounting Education, 24,* 16-34.

Prensky, M. (2010). *Teaching Digital Natives: Partnering for Real Learning*. Thousand Oaks, CA: Corwin.

Prosser, M., Ramsden, P., Trigwell, K., & Martin, E. (2003). Dissonance in experience of teaching and its relation to the quality of student learning. *Studies in Higher Education, 28,* 37-48.

Pryor, J. & Crossouard, B. (2008). A socio-cultural theorisation of formative assessment. *Oxford Review of Education, 34(1),* 1-20.

Race, P. (2005). *Making learning happen: a guide for post-compulsory education*. SAGE Publications: London.

Ramburuth, P., & McCormick, J. (2001). Learning diversity in higher education: A comparative study of Asian international and Australian students. *Higher Education, 42,* 333-350.

Roos, B., & Hamilton, D. (2005). Formative assessment: A cybernetic viewpoint. *Assessment in Education: Principles, Policy and Practice, 12,* 7-20.

Rovai, A. (2000). Online and traditional assessments: what is the difference? *Internet and Higher Education, 3,* 141-151.

Rowe, A., & Wood, L. (2008). Student Perceptions and Perceptions for Feedback. *Asian Social Science, 4(3),* 78-88.

Rowley, J. (2012). Conducting research interviews. *Management Research Review, 35(3/4),* 260-271.

Rust, C., O'Donovan, B., & Price, M. (2005). A social constructivist assessment process model: how the research literature shows us this could be best practice. *Assessment and Evaluation in Higher Education, 30,* 231-240.

Rust, C., Price, M., & O'Donovan, B. (2003). Improving students' learning by developing their understanding of assessment criteria and processes. *Assessment and Evaluation in Higher Education, 28,* 147-164.

Sadler, D. (1989). Formative assessment and the design of instructional systems. *Instructional Science, 18,* 119-144.

Stewart, D. (2006). *Focus Groups: Theory and Practice*. SAGE Publications: California, U.S.A.

Stoicovy, C., & Sanchez, J. (2007). Crossing the Digital Divide: Online Portfolios in a Diverse Student Environment. In I. Yukiko, *Technology and Diversity in Higher*

Education: New Challenges (Chap, 4, 65-80). London: Information Science Publishing.

Thompson, P. (2013). The digital natives as learners: technology use patterns and approaches to learning. *Computer & Education, 65(1),* 12-33.

Torrance, H., & Pryor, J. (2001). Developing formative assessment in the classroom: Using action research to explore and modify theory. *British Educational Research Journal, 26,* 615-631.

Trigwell, K., & Shale, S. (2004). Student learning and the scholarship of university teaching. *Studies in Higher Education, 29(4),* 523-536.

Van der Kleij, F., Feskens, R., & Eggen, T. (2015). Effects of Feedback in a Computer-Based Learning Environment on Students' Learning Outcomes: A Meta-Analysis. *Review of Educational Research, 85(4),* 475-511.

Watty, K. (2006). Addressing the basics: Academics' views of the purpose of higher education. *Australian Educational Researcher, 33,* 23-39.

White, N. (2007). The customer is always right? Student discourse about higher education in Australia. *Higher Education, 54,* 593-604.

Whitelock, D., & Brasher, A. (2006). Developing a Roadmap for e-Assessment: Which Way Now? In *Danson, Myles (ED) Proceedings for the 10th CAA International Computer Assisted Assessment Conference* at Loughborough University.

Winter, R. (1996). Some principles and procedures for the conduct of action research. In O. Zuber-Skerritt, *New Direction of Action Research.* London: Falmer Press.

Wollscheid, S., Sjaastad, J., & Tomte, C. (2016). The impact of digital devices vs. Pen(cil) and paper on primary school students' writing skills- A research review. *Computer & Education, 95,* 19-35.

Wong, C., Wong, W., & Yeung, C. (2001). Student behaviour and performance in using a web-based assessment system. *Innovations in Education and Teaching International, 38(4),* 339-346.

Wong, L. (2009). E-assessment: its implementation and impact on learning outcomes. *Journal of Applied Research in Higher Education, 1(1),* 50-60.

Zeni, J. (1998). A guide to ethical issues and action research. *Education Action Research, 6(1),* 9-19.